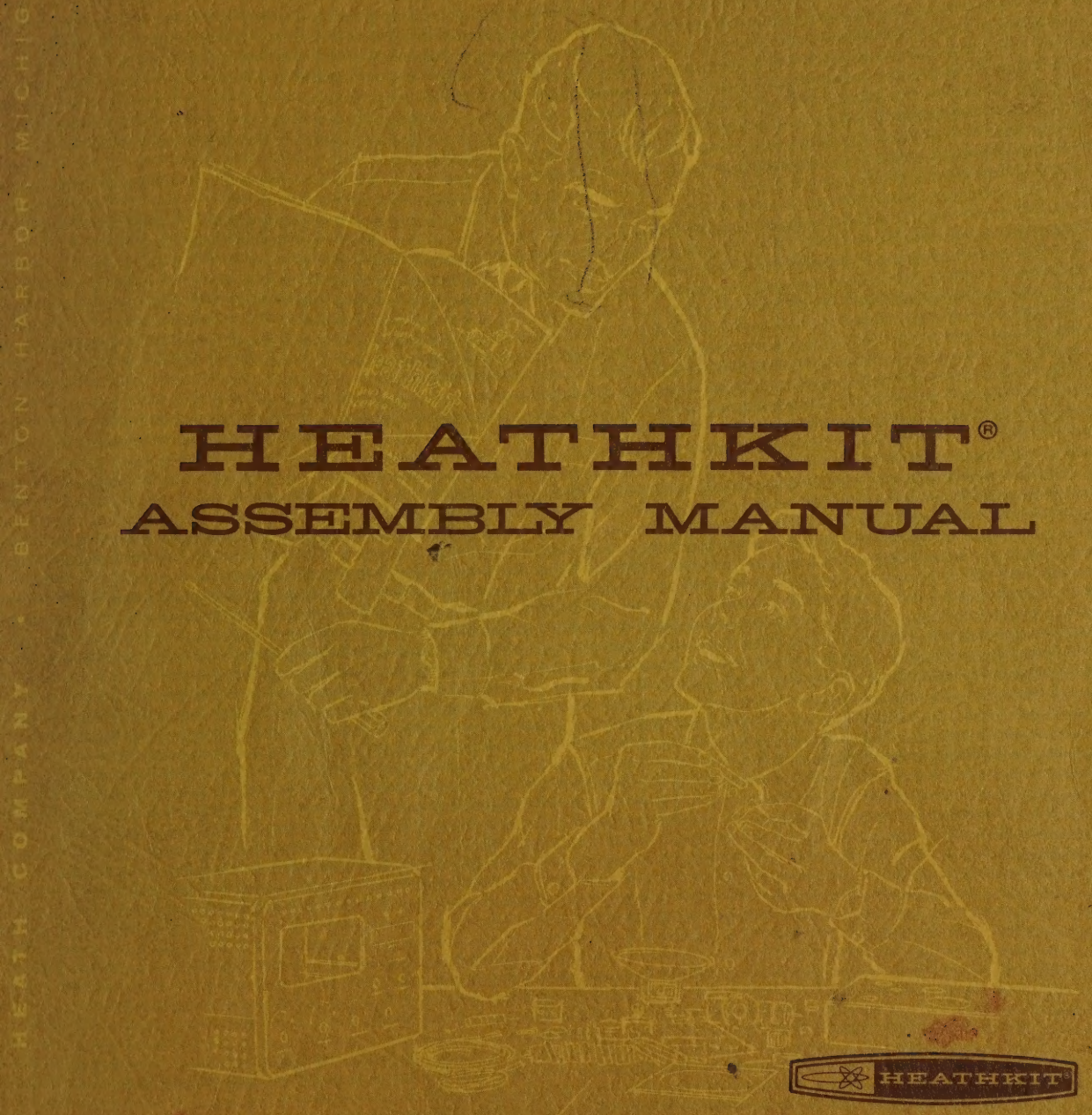
PRICE $1.00

HEATH COMPANY • BENTON HARBOR, MICHIGAN



HEATHKIT®
ASSEMBLY MANUAL

HEATHKIT®

MOBILE SPEAKER

MODEL HS-24

RESISTOR AND CAPACITOR COLOR CODES

RESISTORS

The colored bands around the body of a color coded resistor represent its value in ohms. These colored bands are grouped toward one end of the resistor body. Starting with this end of the resistor, the first band represents the first digit of the resistance value; the second band represents the second digit; the third band represents the number by which the first two digits are multiplied. A fourth band of gold or silver represents a tolerance of ±5% or ±10% respectively. The absence of a fourth band indicates a tolerance of ±20%.

The physical size of a composition resistor is related to its wattage rating. Size increases progressively as the wattage rating is increased. The diameters of 1/2 watt, 1 watt and 2 watt resistors are approximately 1/8", 1/4" and 5/16", respectively.

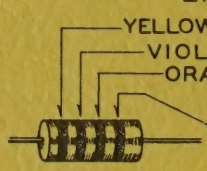
The color code chart and examples which follow provide the information required to identify color coded resistors.

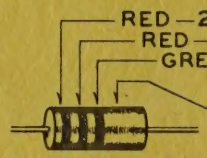
CODE

COLOR	1ST DIGIT	2ND DIGIT	MULTIPLIER
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,000
GOLD	-	-	.1
SILVER	-	-	.01

TOLERANCE
GOLD ±5%
SILVER ±10%
NO BAND ±20%

EXAMPLES





CAPACITORS

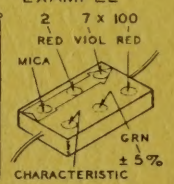
Generally, only mica and tubular ceramic capacitors, used in modern equipment, are color coded. The color codes differ somewhat among capacitor manufacturers, however the codes shown below apply to practically all of the mica and tubular ceramic capacitors that are in common use. These codes comply with EIA (Electronics Industries Association) Standards.

MICA

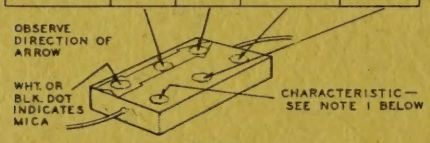
CODE

COLOR	1ST DIGIT	2ND DIGIT	MULTIPLIER	TOLER. %
BLACK	0	0	1	±20
BROWN	1	1	10	—
RED	2	2	100	± 2
ORANGE	3	3	1,000	± 3
YELLOW	4	4	10,000	—
GREEN	5	5	—	± 5
BLUE	6	6	—	—
VIOLET	7	7	—	—
GRAY	8	8	—	—
WHITE	9	9	—	—
GOLD	-	-	.1	—
SILVER	-	-	.01	± 10

EXAMPLE



2,700 μμf ±5%
OR .0027 μfd



(VALUE IN μμf—SEE NOTE 3 BELOW)

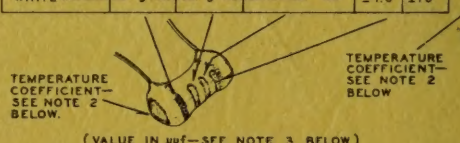
TUBULAR CERAMIC

Place the group of rings or dots to the left and read from left to right.

CODE

COLOR	1ST DIGIT	2ND DIGIT	MULTIPLIER	TOLER. % 10 OR LESS	TOLER. % OVER 10
BLACK	0	0	1	± 20	± 20
BROWN	1	1	10	± 0.1	± 1
RED	2	2	100	—	± 2
ORANGE	3	3	1,000	—	± 2.5
YELLOW	4	4	10,000	—	—
GREEN	5	5	—	± 0.5	± 5
BLUE	6	6	—	—	—
VIOLET	7	7	—	—	—
GRAY	8	8	—	± 0.25	—
WHITE	9	9	—	± 1.0	± 10

EXAMPLE



(VALUE IN μμf—SEE NOTE 3 BELOW)

NOTES:

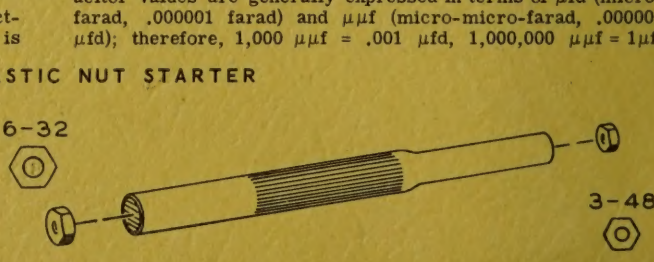
1. The characteristic of a mica capacitor is the temperature coefficient, drift capacitance and insulation resistance. This information is not usually needed to identify a capacitor but, if desired, it can be obtained by referring to EIA Standard, RS-153 (a Standard of Electronic Industries Association.)

2. The temperature coefficient of a capacitor is the predictable change in capacitance with temperature change and is expressed in parts per million per degree centigrade. Refer to EIA Standard, RS-198 (a Standard of Electronic Industries Association.)

3. The farad is the basic unit of capacitance, however capacitor values are generally expressed in terms of μfd (microfarad, .000001 farad) and μμf (micro-micro-farad, .000001 μfd); therefore, 1,000 μμf = .001 μfd, 1,000,000 μμf = 1μfd.

USING A PLASTIC NUT STARTER

A plastic nut starter offers a convenient method of starting the most used sizes: 3/16" and 1/4" (3-48 and 6-32). When the correct end is pushed down over a nut, the pliable tool conforms to the shape of the nut and the nut is gently held while it is being picked up and started on the screw. The tool should only be used to start the nut.



Assembly
and
Installation
of the

HEATHKIT

MOBILE SPEAKER

MODEL HS-24

HEATH COMPANY,
BENTON HARBOR,
MICHIGAN

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9/4/64

SPECIFICATIONS

Speaker Size	4" x 6" oval.
Voice Coil Impedance	8 Ω.
Resonant Frequency	160 cps (open air).
Frequency Response	200 to 2000 cps (open air).
Magnet Weight	3.16 oz.
Cabinet	19 gauge steel, green wrinkle finish.
Dimensions	6-11/32" long x 4-3/4" high x 2-1/2" deep.
Net Weight	2-1/2 lbs.
Shipping Weight	3-1/2 lbs.

All prices are subject to change without notice. The Heath Company reserves the right to discontinue instruments and to change specifications at any time without incurring any obligation to incorporate new features in instruments previously sold.

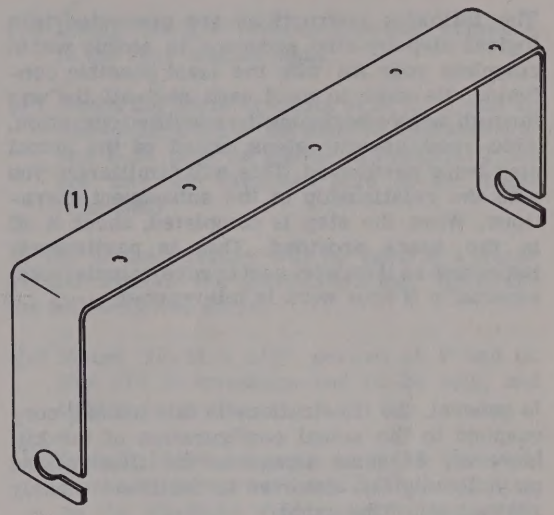
INTRODUCTION

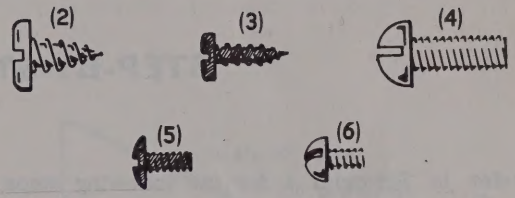
The Heathkit Model HS-24 Mobile Speaker is designed to efficiently reproduce audio signals from communication type receivers. Styling of the rugged steel cabinet matches that of other current Heath Amateur Radio mobile equipment. The gimbal bracket permits convenient under-the-dash mobile mounting; felt feet are also supplied for desk-top, fixed-station use of the Speaker.

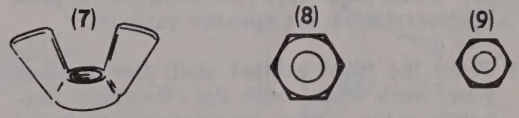
PARTS LIST

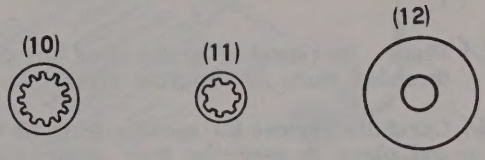
PART No.	PARTS Per Kit	DESCRIPTION
Metal Parts		
90-M284P65	1	Front cabinet shell
90-M285F	1	Rear cabinet shell
(1) 204-M621F	1	Gimbal bracket
Hardware		
(2) 250-51	5	#10 sheet metal screw
(3) 250-155	4	#6 sheet metal screw (black)
(4) 250-141	2	10-24 x 1/2" screw
(5) 250-116	4	6-32 x 1/4" screw (black)
(6) 250-7	4	6-32 x 3/16" screw
(7) 252-31	2	10-24 wingnut
(8) 252-30	2	10-24 nut
(9) 252-3	8	6-32 nut
(10) 254-3	2	#10 lockwasher
(11) 254-1	8	#6 lockwasher
(12) 253-19	2	#10 flat steel washer
(13) 204-9	4	Angle bracket
Miscellaneous		
(14) 73-1	1	3/8" rubber grommet
209-28	1	Speaker grille
263-7	4	Felt feet
343-6	1	Shielded cable
401-97	1	Speaker
(15) 438-4	1	Phono plug
331-6		Solder
595-698	1	Manual

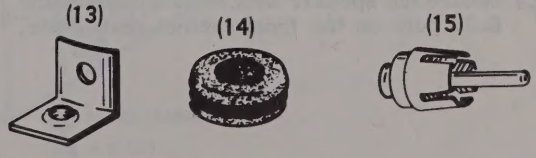
PARTS PICTORIAL











ASSEMBLY NOTES

The following instructions are presented in a logical step-by-step sequence to enable you to complete your kit with the least possible confusion. Be sure to read each step all the way through before beginning the specified operation. Also read several steps ahead of the actual step being performed. This will familiarize you with the relationship of the subsequent operations. When the step is completed, check it off in the space provided. This is particularly important as it may prevent errors or omissions, especially if your work is interrupted.

In general, the illustrations in this manual correspond to the actual configuration of the kit; however, in some instances the illustrations may be slightly distorted to facilitate clearly showing all of the parts.

When soldering a connection, position the work, if possible, so that gravity will help to keep the solder where you want it. The joint to be soldered should be heated with the flat side of the soldering iron tip sufficiently to melt the solder. Apply only enough solder to the heated terminal to thoroughly wet the junction. Remove the solder and then the iron when a smooth soldered junction appears. Do not move the wire until the solder has solidified.

ROSIN CORE SOLDER HAS BEEN SUPPLIED WITH THIS KIT. THIS TYPE OF SOLDER MUST BE USED FOR ALL SOLDERING IN THIS KIT. ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE EQUIPMENT IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. IF ADDITIONAL SOLDER IS NEEDED, BE SURE TO PURCHASE ROSIN CORE (60:40 or 50:50 TIN-LEAD CONTENT) RADIO TYPE SOLDER.

STEP-BY-STEP ASSEMBLY

Refer to Pictorial 1 for the following steps.

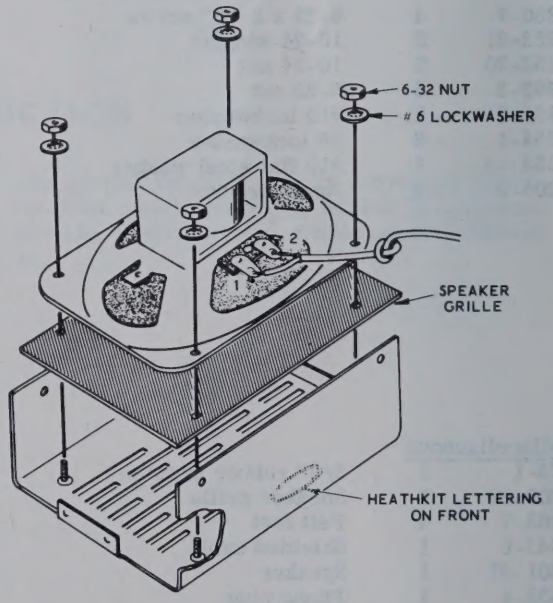
( ) Lay a soft cloth over your work area to prevent scratching the speaker cabinet.

( ) Place the front cabinet shell face down on your work area, with the "Heathkit" lettering at the bottom, as marked in Pictorial 1.

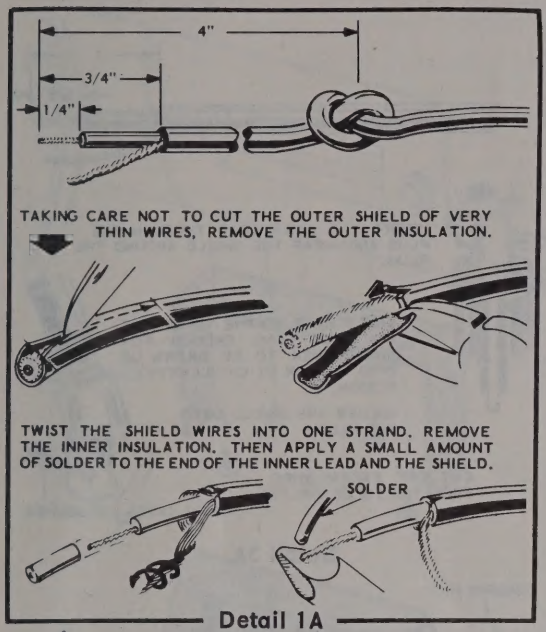
( ) Place the speaker grille over the four threaded studs on the front cabinet shell.

( ) Carefully remove the speaker from its box and place it over the four studs on the front cabinet shell. Position the speaker lugs as shown in Pictorial 1.

( ) Secure the speaker with #6 lockwashers and 6-32 nuts on the front cabinet shell studs.



PICTORIAL 1


4"
3/4"
1/4"
TAKING CARE NOT TO CUT THE OUTER SHIELD OF VERY THIN WIRES, REMOVE THE OUTER INSULATION.
TWIST THE SHIELD WIRES INTO ONE STRAND. REMOVE THE INNER INSULATION. THEN APPLY A SMALL AMOUNT OF SOLDER TO THE END OF THE INNER LEAD AND THE SHIELD.
SOLDER

Detail 1A

( ) Locate the shielded cable and tie a knot 4" from one end. See Detail 1A.

( ) Referring to Detail 1A, prepare the knotted end of the shielded cable.

( ) Connect the inner lead of the prepared end of the shielded cable to lug 1 and the shield lead to lug 2 of the speaker. Solder each of these connections. Be careful not to melt the cable insulation when soldering, as a short circuit could result.

Refer to Pictorial 2 for the following steps.

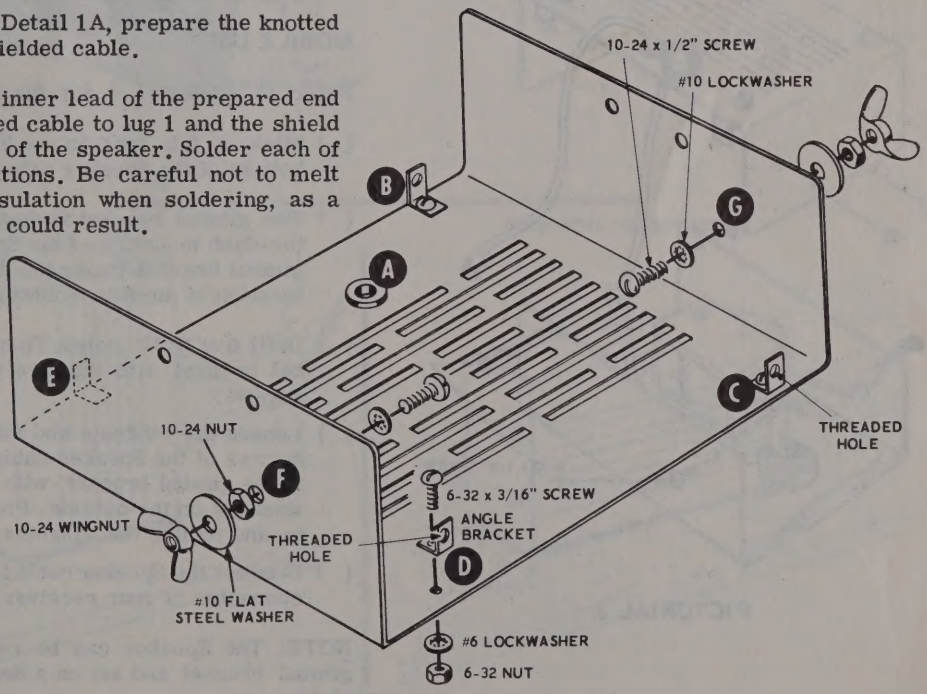
( ) Install the 3/8" rubber grommet at hole A in the rear cabinet shell.

( ) Mount the angle brackets at B, C, D, and E. Use 6-32 x 3/16" screws, #6 lockwashers, and 6-32 nuts as shown in Pictorial 2. Do not use the threaded hole of the angle brackets.

NOTE: If the Speaker will be used at a fixed-station without the gimbal bracket, disregard the following two steps.

( ) Mount 10-24 x 1/2" screws at F and G. Use #10 lockwashers and 10-24 nuts, and tighten securely.

( ) Install 10-24 wingnuts and #10 flat steel washers on screws F and G. Do not tighten, as the wingnuts will be used to secure the gimbal bracket later.



PICTORIAL 2

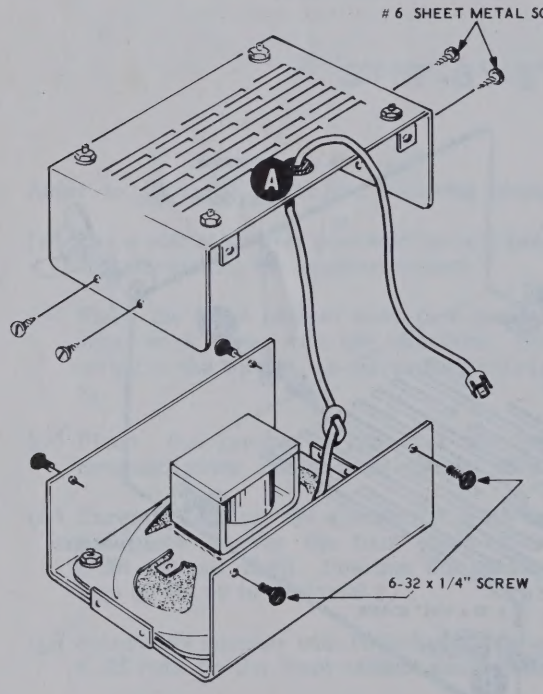
Refer to Pictorial 3 for the following steps.

(✓) Place the free end of the shielded cable through grommet A in the rear cabinet shell.

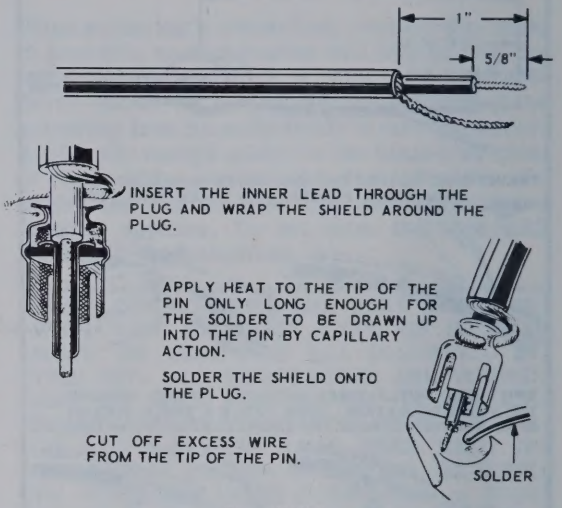
(✓) Place the rear cabinet shell in position on the front cabinet shell as shown in Pictorial 3. Secure the front and rear cabinet shells together with four 6-32 x 1/4" screws. The screws go into the threaded holes of the angle brackets.

(✓) Secure each side of the cabinet shells with two #6 sheet metal screws.

NOTE: A phono type socket is used as the speaker audio output connector in many communication type receivers, therefore, a phono plug is provided with this kit. If your receiver has a different type of audio output connector, a suitable plug should be obtained locally and installed on the shielded cable of the Speaker.



PICTORIAL 3


1"
5/8"
INSERT THE INNER LEAD THROUGH THE PLUG AND WRAP THE SHIELD AROUND THE PLUG.
APPLY HEAT TO THE TIP OF THE PIN ONLY LONG ENOUGH FOR THE SOLDER TO BE DRAWN UP INTO THE PIN BY CAPILLARY ACTION.
SOLDER THE SHIELD ONTO THE PLUG.
CUT OFF EXCESS WIRE FROM THE TIP OF THE PIN.
SOLDER

Detail 3A

( ) Referring to Detail 3A, prepare the free end of the shielded cable. Then install the phono plug on the prepared end.

MOBILE USE

Refer to Pictorial 4 for the following steps.

( ) Stick a felt foot to each corner of the bottom of the Speaker cabinet.

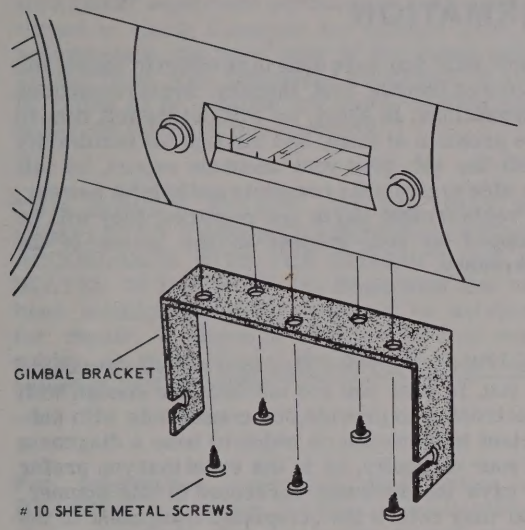
( ) The gimbal bracket is designed for under-the-dash mounting of the Speaker. Place the gimbal bracket under the dash and mark the location of the five mounting holes.

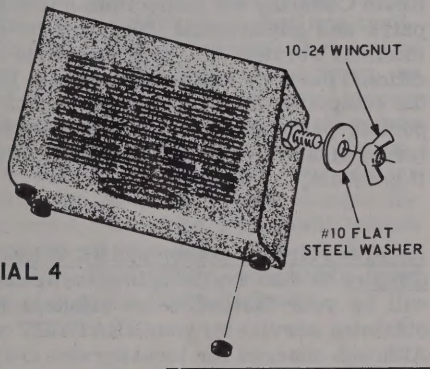
( ) Drill five 5/32" holes. Then secure the gimbal bracket with the five #10 sheet metal screws.

( ) Loosen the wingnuts and slide the mounting screws of the Speaker cabinet into the slots in the gimbal bracket, with the #10 flat steel washers on the outside. Position the Speaker and tighten the wingnuts.

( ) Connect the Speaker cable to the audio output connector of your receiver.

NOTE: The Speaker can be removed from the gimbal bracket and set on a desk top for fixed-station use.





PICTORIAL 4

DESK-TOP USE

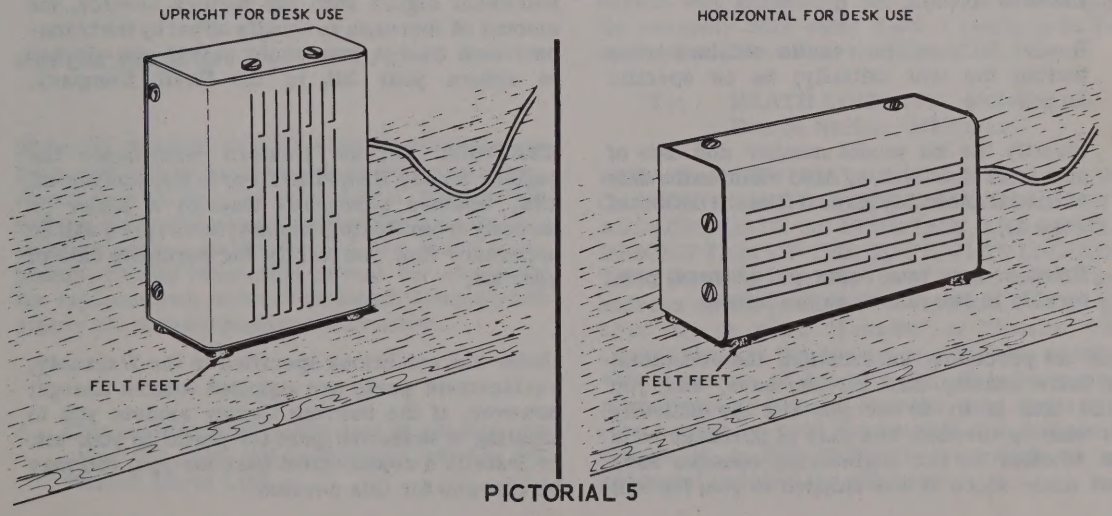
Refer to Pictorial 5 for the following steps.

( ) The Speaker may either be positioned horizontally or vertically. If horizontal positioning is desired, stick a felt foot on each corner of the bottom of the Speaker cabinet.

( ) For vertical positioning, stick a felt foot on each corner of either end of the Speaker cabinet.

( ) Connect the speaker cable to the audio output connector of your receiver.

This completes the assembly and installation of your Heathkit Mobile Speaker.



PICTORIAL 5

SERVICE INFORMATION

SERVICE

If, after applying the information in this manual and your best efforts, you are still unable to obtain proper performance, it is suggested that you take advantage of the technical facilities which the Heath Company makes available to its customers.

The Technical Consultation Department is maintained for your benefit. This service is available to you at no charge. Its primary purpose is to provide assistance for those who encounter difficulty in the construction, operation or maintenance of HEATHKIT equipment. It is not intended, and is not equipped to function as a general source of technical information involving kit modifications nor anything other than the normal and specified performance of HEATHKIT equipment.

Although the Technical Consultants are familiar with all details of this kit, the effectiveness of their advice will depend entirely upon the amount and the accuracy of the information furnished by you. In a sense, YOU MUST QUALIFY for GOOD technical advice by helping the consultants to help you. Please use this outline:

1. When writing, clearly describe the nature of the trouble and mention all associated equipment. Specifically report operating procedures, connections to other units, and anything else that might help to isolate the cause of trouble.

2. Report fully on the results obtained when testing the unit initially; be as specific as possible.

3. Identify the kit model number and date of purchase if available. Also mention the date of the kit assembly manual (Date at bottom of Page 1.)

4. Print or type your name and address, preferably in two places on the letter.

With the preceding information, the consultant will know exactly what kit you have, what you would like it to do for you and the difficulty you wish to correct. The date of purchase tells him whether or not engineering changes have been made since it was shipped to you. He will know what you have done in an effort to locate the cause of trouble, and, thereby, avoid repetitious suggestions. In short, he will devote full time to the problem at hand, and through his familiarity with the kit, plus your accurate report, he will be able to give you a complete and helpful answer. If replacement parts are required, they will be shipped to you, subject to the terms of the Warranty.

The Factory Service facilities are also available to you, in case you are not familiar enough with electronics to provide our consultants with sufficient information on which to base a diagnosis of your difficulty, or in the event that you prefer to have the difficulty corrected in this manner. You may return the completed equipment to the Heath Company for inspection and necessary repairs and adjustments. You will be charged a minimal service fee, plus the price of any additional parts or material required. However, if the completed kit is returned within the Warranty period, parts charges will be governed by the terms of the Warranty. State the date of purchase, if possible.

Local Service by Authorized HEATHKIT Service Centers is also available in some areas and often will be your fastest, most efficient method of obtaining service for your HEATHKIT equipment. Although charges for local service are generally somewhat higher than for factory service, the amount of increase is usually offset by the transportation charge you would pay if you elected to return your kit to the Heath Company.

HEATHKIT Service Centers will honor the regular 90 day HEATHKIT Parts Warranty on all kits, whether purchased through a dealer or directly from Heath Company; however, it will be necessary that you verify the purchase date of your kit.

Under the conditions specified in the Warranty, replacement parts are supplied without charge; however, if the Service Center assists you in locating a defective part (or parts) in your kit, or installs a replacement part for you, you may be charged for this service.

HEATHKIT equipment purchased locally and returned to Heath Company for service must be accompanied by your copy of the dated sales receipt from your authorized HEATHKIT dealer in order to be eligible for parts replacement under the terms of the Warranty.

THIS SERVICE POLICY APPLIES ONLY TO COMPLETED EQUIPMENT CONSTRUCTED IN ACCORDANCE WITH THE INSTRUCTIONS AS STATED IN THE MANUAL. Equipment that has been modified in design will not be accepted for repair. If there is evidence of acid core solder or paste fluxes, the equipment will be returned NOT repaired.

For information regarding modification of HEATHKIT equipment for special applications, it is suggested that you refer to any one or more of the many publications that are availably on all phases of electronics. They can be obtained at or through your local library, as well as at most electronic equipment stores. Although the Heath Company sincerely welcomes all comments and suggestions, it would be impossible to design, test, evaluate and assume responsibility for proposed circuit changes for special purposes. Therefore, such modifications must be made at the discretion of the kit builder, using information available from sources other than the Heath Company.

REPLACEMENTS

Material supplied with HEATHKIT products has been carefully selected to meet design requirements and ordinarily will fulfill its function without difficulty. Occasionally improper instrument operation can be traced to a faulty component. Should inspection reveal the necessity for replacement, write to the Heath Company and supply all of the following information.

A. Thoroughly identify the part in question by using the part and description found in the Manual Parts List.

B. Identify the type and model number of kit in which it is used.

C. Mention date of purchase.

D. Describe the nature of defect or reason for requesting replacement.

The Heath Company will promptly supply the necessary replacement. PLEASE DO NOT RETURN THE ORIGINAL COMPONENT UNTIL SPECIFICALLY REQUESTED TO DO SO. Do not dismantle the component in question as this will void the guarantee. This replacement policy does not cover the free replacement of parts that may have been broken or damaged through carelessness on the part of the kit builder.

SHIPPING INSTRUCTIONS

In the event that your instrument must be returned for service, these instructions should be carefully followed.

Wrap the equipment in heavy paper, exercising care to prevent damage. Place the wrapped equipment in a stout carton of such size that at least three inches of shredded paper, excelsior, or other resilient packing material can be placed between all sides of the wrapped equipment and the carton. Close and seal the carton with gummed paper tape, or alternately, tie securely with stout cord. Clearly print the address on the carton as follows:

To: HEATH COMPANY
Benton Harbor, Michigan

ATTACH A LETTER TO THE OUTSIDE OF THE CARTON BEARING YOUR NAME, COMPLETE ADDRESS, DATE OF PURCHASE, AND A BRIEF DESCRIPTION OF THE DIFFICULTY ENCOUNTERED. Also, include your name and return address on the outside of the carton. Preferably affix one or more "Fragile" or "Handle With Care" labels to the carton, or otherwise so mark with a crayon of bright color. Ship by insured parcel post or prepaid express; note that a carrier cannot be held responsible for damage in transit if, in HIS OPINION, the article is inadequately packed for shipment.

WARRANTY

Heath Company warrants that all Heathkit parts shall be free of all defects in materials and workmanship under normal use and service, and in fulfillment of such warranty Heath Company will, for a period of three months from the date of shipment, replace any part upon verification that it is defective.

The foregoing warranty shall apply only to the original buyer, and is and shall be in lieu of all other warranties, whether express or implied and of all other obligations or liabilities on the part of Heath Company and in no event shall Heath Company be liable for any anticipated profits, consequential damages, loss of time or other losses incurred by the buyer in connection with the purchase, assembly or operation of Heathkits or components thereof. No replacement shall be made of parts damaged by the buyer in the course of handling or assembling Heathkit equipment.

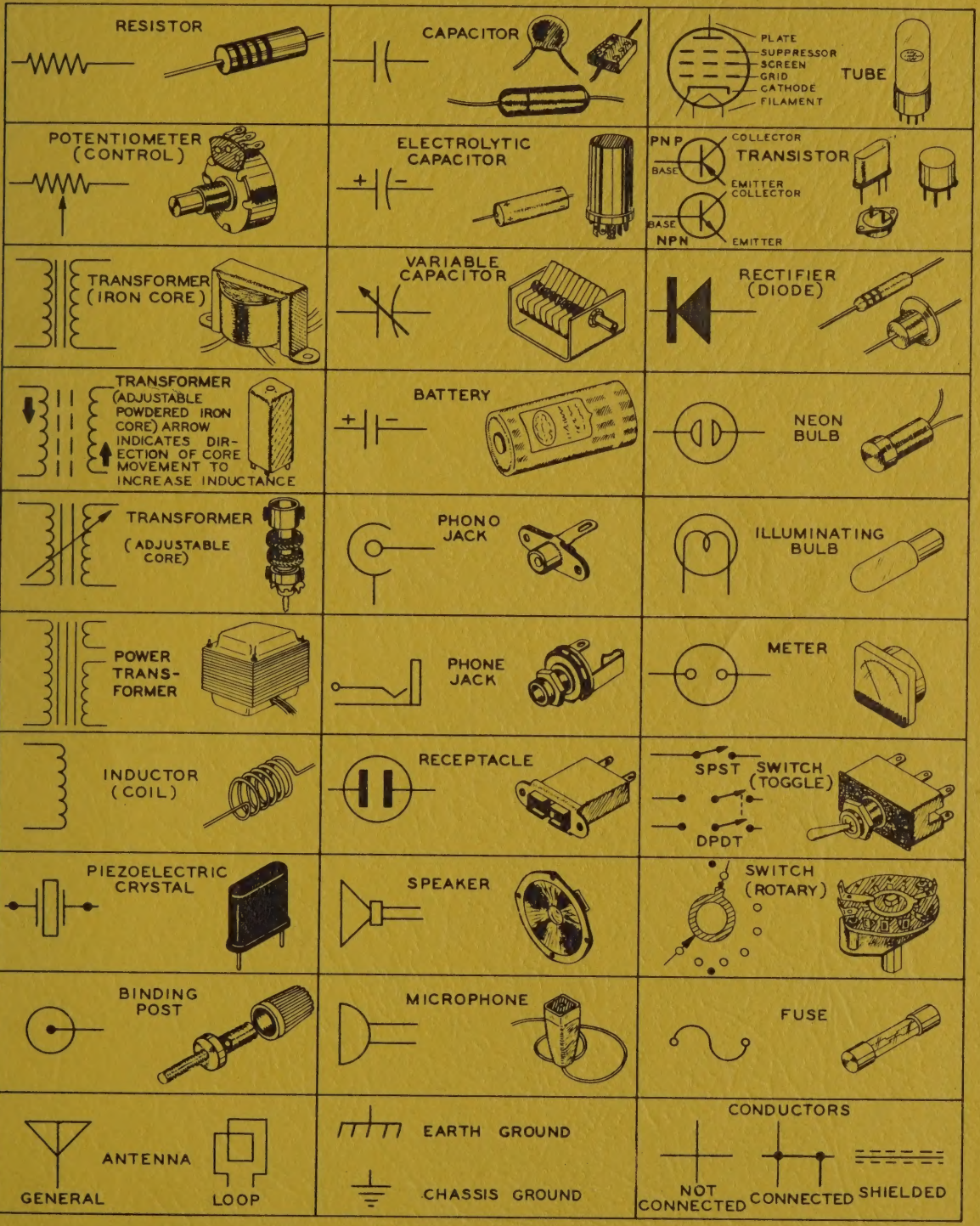
The foregoing warranty is completely void if corrosive solder or fluxes have been used in wiring the equipment. Heath Company will not replace or repair any equipment in which corrosive solder or fluxes have been used.

This warranty applies only to Heath equipment sold and shipped within the continental United States including APO and FPO shipments. Warranty replacements for Heathkit equipment outside the United States is on a f.o.b. factory basis. Contact the Heathkit authorized distributor in your country or write: Heath Company, International Division, Benton Harbor, Michigan, U.S.A.

HEATH COMPANY

TYPICAL COMPONENT TYPES

This chart is a guide to commonly used types of electronic components. The symbols and related illustrations should prove helpful in identifying most parts and reading the schematic diagrams.



HEATH COMPANY

BENTON HARBOR, MICHIGAN

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